OAR Mitigation Related Actions: Key Science-related Activities of Interest

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Presentation to EPA's Scientific Advisory Board

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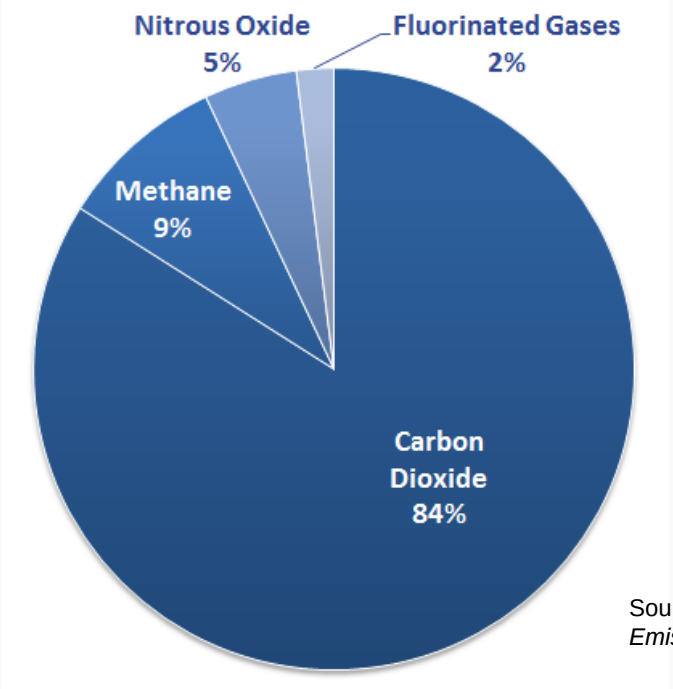
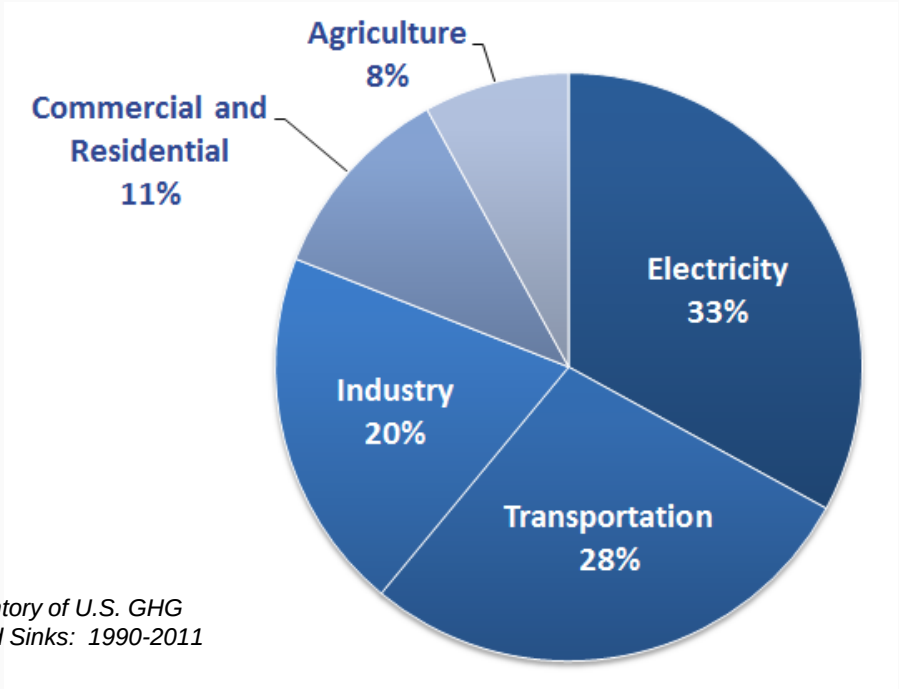
OAR Responsible for Official U.S. GHG Emissions Inventory

- Annual report Inventory of U.S. Greenhouse Gas Emissions and Sinks produced by EPA/OAR in collaboration with dozens of U.S. federal agencies, academic institutions & industry stakeholders
- This report tracks total annual U.S. emissions and removals by source, economic sector, and greenhouse gas going back to 1990





Source: *Inventory of U.S. GHG Emissions and Sinks: 1990-2011*

U.S. GHG Inventory (cont'd)

- U.S. Government, led by OAR, annually submits national U.S. GHG inventory to UNFCCC
  - Submitted annually for over 20 years to meet U.S. commitments under the UNFCCC
- Calculated using methodologies published by IPCC Task Force on National GHG Inventories
  - IPCC guidance for transparent, consistent, complete, comparable, and accurate international inventories
- US GHG Inventory also undergoes domestic 30-day public review and comment period
  - As well as targeted technical review by U.S. experts
  - International peer review through the UNFCCC
- Following IPCC guidance, EPA/OAR engages with stakeholders to improve calculation activity data and emission factors

Greenhouse Gas Reporting Program (GHGRP)

- Launched in response to FY 2008 Consolidated Appropriations Act
- Annual reporting of GHGs by 41 source categories
  - 33 types of direct emitters
  - 6 types of suppliers of fuel and industrial GHGs
  - 2 types of facilities that inject CO_2 underground for geologic sequestration, enhanced oil recovery, or any other purpose
- 25,000 metric tons CO_2 equivalent (CO_2e) or more per year reporting threshold for most sources
- Direct reporting to EPA electronically
- EPA verification of GHG data through a combination of EPA review, thousands of electronic checks, and working directly with reporters to identify and correct errors.
- Most source categories began collecting data in 2010, with first annual reports submitted to EPA in September 2011
  - An additional 12 source categories began collecting data in 2011, with first annual reports submitted to EPA in September 2012
  - We now have 3 years of data for 29 source categories and 2 years of data for 12 source categories

IPCC and USGCRP processes

- OAR continues to primarily rely on the major scientific assessments (USGCRP, IPCC, NRC) for climate-focused actions under the Clean Air Act
- OAR coordinates with ORD on EPA participation in government review process of IPCC assessment reports
- ORD is official representative to USGCRP but OAR also participates (e.g., review of draft National Climate Assessment) including working groups
  - USGCRP interagency workgroup on Climate Change and Human Health provides forum to coordinate specifically on climate and public health issues.

Recent SAB Review Related to GHG Permitting

- Regulation of GHGs under the CAA triggers certain permitting requirements under the New Source Review (NSR) and Title V programs.
  - Permits do not set standards, but instead include requirements for individual facilities based on an assessment of that specific facility and available technology.
- EPA consulted the SAB on the accounting framework for biogenic CO_2 emissions from stationary sources for the purposes of permitting.
  - The EPA is considering the feedback from SAB's year-long peer review of the draft accounting framework, which concluded with a written Advisory in September 2012, for use in addressing the treatment of CO_2 emissions from biogenic feedstocks in the PSD and title V permitting programs.

Mobile Source Greenhouse Gas Rules

- EPA and NHTSA jointly developed:
  - GHG/fuel economy standards for model year 2012-2016 and 2017-2025 light-duty vehicles
  - GHG emission and fuel efficiency standards for model year 2014-2018 heavy-duty vehicles

Analyses to Support Mobile Source GHG Rules

- OAR relied on analytic tools which have received extensive peer review. Examples:
  - OMEGA (Optimization Model for Emissions of Greenhouse gases from Automobiles)
    - Models technology costs and effectiveness of different strategies to meet vehicle GHG standards
  - ALPHA (Advanced Light-Duty Powertrain and Hybrid Analysis Tool)
    - Estimates GHG emissions for various combinations of future technologies in light-duty vehicles
    - Published several peer-reviewed technical papers on conventional and hybrid vehicle model development and validation
  - GEM (Greenhouse gas Emission Model)
    - Estimates the GHG emissions and fuel efficiency performance of heavy-duty vehicles

Analyses of GHG Impacts of Renewable Fuel Standard

- For the RFS 2010 Final Rule, EPA developed a methodology for assessing the lifecycle GHGs of renewable fuels, as required by statute
  - Methodology includes a suite of models that analyze key phases of the lifecycle of a particular renewable fuel, including domestic and international agricultural sector impacts.

- EPA initiated an independent peer review of components of the LCA, covering four areas:
  1. Land use modeling (use of satellite data/land conversion GHG factors)
  2. Methods to account for the variable timing of GHG emissions
  3. GHG emissions from foreign crop production (modeling and data used)
  4. How the models EPA relied upon are used together to provide overall lifecycle estimates

- EPA uses this methodology in the evaluation of new fuels and feedstocks under the RFS program.

Future Transportation Climate Activities

- Light-Duty GHG Midterm Evaluation
  - EPA, along with NHTSA and California, committed to midterm evaluation of the 2022-2025 standards
  - EPA/NHTSA/CARB will issue a draft Technical Assessment Report for public comment by November 2017
  - Final EPA decision on whether the 2022-2025 standards are appropriate by April 2018
  - Beginning extensive stakeholder dialogue as part of transparent process

- Heavy Duty Greenhouse Gas Phase 2
  - As directed by the President in his Climate Action Plan, EPA and NHTSA are developing a second phase of GHG and Fuel Efficiency standards for medium- and heavy-duty vehicles
- RFS
  - Annual volume rules establish required renewable fuel volumes
  - Ongoing rulemakings evaluate potential new renewable fuel pathways

Economy-wide modeling and upcoming SAB review

- Economy-wide models can be used to capture emissions and economic impacts of environmental policies, and understand how both benefits and costs ripple through the economy and the energy system.
- This class of models has been used extensively by EPA, other government agencies, the academic community, and industry in research that assesses the impacts of climate mitigation policies.
- On July 9, 2013 the Acting Administrator asked the SAB staff office to convene an expert panel to advise the EPA on the advantages and limitations of using economy-wide models to capture the broader impacts of both the benefits and costs of environmental policies.